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Abstract

129 Endometrium in Organ Culture and Coculture with Blastocysts: Development of an in vitro Model for Embryo Implantation

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In vivo, embryo implantation initiation depends on the coincidence of the invasive phase of the trophoblast and the 'receptive state' of the endometrium, the latter being controlled by estrogens and progesterone. The molecular basis for implantation is largely unknown so far. In the present communication, we are reporting on our attempts to develop an in vitro culture model for the study of molecular mechanisms involved in this process. In a first series, it was tried to maintain rabbit endometrium in organ culture in a quasi-physiological condition and to induce the morphological transformation as typical for the preimplantation phase. In a subsequent series, we are confronting this endometrial tissue with preimplantation rabbit blastocysts under varying conditions. Endometrial fragments explanted in early pseudopregnancy regenerate new epithelium in the area of the wound during the first 2 days of culture on a gyratory shaker. There is no central necrosis under the conditions used even after 2–6 days. Progesterone substitution causes extensive fusion of epithelial cells similar to what is typically seen in the preimplantation phase in vivo. It appears that only the superficial parts of the epithelium are capable of progesterone-induced fusion. Blastocysts grown in coculture with endometrial fragments (precultured for 2 days) show a remarkable degree of differentiation both in the embryo proper and in the trophoblast. The experiments show that in order to achieve an attachment of blastocysts to endometrial fragments it is critical that both are kept in close contact as they are in the uterus. Confrontation in simple culture systems (e.g. Erlenmeyer flasks on a gyratory shaker) as used for precultering endometrial fragments is not sufficient. Results obtained with modified culture systems will be presented.

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